CHAPTER 2 TRAFFIC IMPACT STUDIES

2.1 PURPOSE

In order to accommodate a proposed development access, traffic must operate safely and at satisfactory levels of service (LOS).

The purpose of this Chapter is to provide for a clear process for determining transportation impacts associated with new development so that the impacts can be mitigated and system capacity can be preserved.

To focus transportation improvement resources consistent with state objectives, this Chapter has identified two sets of level of service standards, one for developed, developing and planned development areas and one for all other areas, which typically are rural areas.

A Traffic Impact Study (TIS) may be initiated by DelDOT, the applicable land use agency, or by the Applicant in anticipation of submission of a subdivision proposal for review.

Depending on the size of and expected trip distribution for a project, a TIS scope may include, but is not limited to, the following types of operational analyses:

a. Highway Capacity Manual/LOS Analysis – This analysis may be required to determine whether the approaches at the site entrance(s) and approaches of nearby intersections operate within acceptable LOS.
b. Queuing Analysis – This analysis may be required to determine whether existing and proposed left-turn storage at the site entrance(s) and nearby intersections is adequate, to assess U-turn lane storage adequacy, or to determine that lane queuing does not block access to turn lanes or spill back into upstream intersections.
c. Safety Analysis – This analysis may consist of a number of factors including review of adequacy of sight distance, accident data, and *Manual on Uniform Traffic Devices* (MUTCD) and DelDOT *Road Design Manual* compliance. More specifically:
    - An Applicant may be asked to evaluate the sight distance at the entrance driveway(s), at intersections within the study area, and at proposed intersections within the subdivision to be constructed.
    - An accident analysis may be required if locations within the proposed study area are known or alleged to be high accident locations. The analysis will be used to determine whether a problem exists, and if so, how the proposed project relates to the problem, and what modifications or improvements need to be made to ensure safe access on the State-maintained roadway system and safe operation on adjacent roadways and intersections.
    - An analysis to provide for an evaluation of roads near the site relative to MUTCD and *Road Design Manual* standards may be requested. This analysis would be requested to identify deficiencies in signing, striping, cross-section or geometry that represent or would represent an unsafe condition.
d. Bicycle, Pedestrian and Transit Facility Analysis - The analysis may be required to identify and evaluate related impacts and

need for enhancements to bicycle, pedestrian, and transit access, circulation, and facilities within the study area.

2.2 AUTHORITY AND RESPONSIBILITY

Whenever the DelDOT Division of Planning, Development Coordination Section (DelDOT) determines that a development proposal exceeds the analysis warrants as defined in Section 2.3, a TIS shall be completed for such proposed development if in the opinion of DelDOT a TIS is necessary. The scope of the TIS shall be based on the type and intensity of the proposed land use change or development.

Independent of the TIS report, the DelDOT Subdivision Section may require an Operational Analysis during its review of site access issues as outlined in Section 3.9.

2.2.1 USE OF TIS FINDINGS

If a TIS is required for a proposed development, DelDOT will direct its preparation for use in determination of impacts to the transportation network. Using the findings of the TIS, DelDOT may provide transportation network improvement and modification requirements to be built or funded by the Applicant, as appropriate. DelDOT may also use the TIS to make recommendations to the local land use agency having land use jurisdiction over the property, or for any other purpose that DelDOT deems appropriate.

2.2.2 AREA-WIDE STUDY

At DelDOT's option, the department may require the Applicant to provide resources to conduct an Area-Wide Study in lieu of a TIS, the results of which will be used to determine transportation impacts and necessary transportation network improvements associated with multiple development proposals or sites. The Applicant shall not be required to pay more than its fair share of the cost of such an Area – Wide study.

2.2.3 STUDY COSTS

If the Applicant desires to proceed with a development for which a TIS is required, the Applicant shall assume full responsibility for all costs incurred in its preparation, or for a portion of the costs associated with the Area-Wide Study.

2.2.4 QUALIFICATIONS TO PERFORM A TRAFFIC IMPACT STUDY

All TIS document submittals shall be signed and sealed by a professional engineer licensed in the State of Delaware.

2.3 TRAFFIC IMPACT STUDY WARRANTS

2.3.1 BASIS FOR RECOMMENDATION

A TIS may be required under any of the following conditions:

1. When a proposed land use change or development will generate 400 vehicles per day (vpd) or more in average weekday or weekend trips, or if it will generate 50 vehicles per hour (vph) or more during any one hour time period, as determined by DelDOT.
   a. No deductions shall be allowed for internal or pass-by trips when determining warrant requirements for a TIS. The Applicant may, however, present information at the Scoping Meeting and DelDOT, in its sole discretion, may waive the TIS report based on internal trip data presented.
   b. Peak-hour shall be the highest of the a.m., p.m., or weekend peak hour trip generation as determined in accordance with Section 2.8.6.

c. Daily traffic volumes shall be the higher of the weekday, Saturday or Sunday volumes as determined in accordance with Section 2.8.6

or

2. When a new access entrance for an existing land use is proposed for a state-maintained roadway, and the total trips generated by the site would be increased by 400 vpd or 50 vph in the peak hour;

or

3. When in a local land use process, DelDOT finds that a development and/or change in zoning is proposed for an area where roadways or intersections operate at or below LOS D in a developed, developing or planned development area or, LOS C in a rural area. The criteria shall not be required in cases where the proposed rezoning would result in the same or fewer trips being generated from the site;

or

4. When requested by a local land use agency that has more stringent TIS warrant requirements than those provided in this section, DelDOT may, at its option, or as required by agreement with the local land use agency, provide a review of the project using the more stringent TIS requirements; or

5. When in the opinion of the DelDOT, it is in the public interest to obtain further traffic information on a proposed development.

2.3.2 AREA-WIDE STUDY FEE

Provisions of Sections 2.3.1.1 and 2.3.1.2 not withstanding, if a development will generate fewer than 2000 vpd, fewer than 200 vehicles in any hour of any day, and the Applicant has not been required to conduct a TIS under the provisions of Section 2.3.1.3, 2.3.1.4 or 2.3.1.5, the Applicant, at its discretion, will be permitted, in lieu of conducting a TIS, to contribute funds equal to five dollars ($ 5.00) per daily trip to be generated by the development (Area-Wide Study Fee). The Area-Wide Study Fee shall be paid in conjunction with the Initial Stage Fees as discussed in Section 1.4.2. DelDOT shall apply the collected fee to complete an Area-Wide Study that includes the development or transportation improvements that benefit the development. Payment of an Area-wide Study Fee in lieu of a TIS will not preclude the Applicant's responsibility for funding and/or construction of its share of off-site improvements. Those improvements may be determined to be needed by the Area-Wide Study or other studies, e.g. TIS for other nearby developments.

2.3.3 DEVELOPMENT GENERATING FEWER THAN 400 VPD AND 50 VPH

Developments generating fewer than 50 vph in any hour and 400 vpd shall be subject to the provisions of this chapter only if a TIS is required under the provisions of Section 2.3.1.4 or 2.3.1.5.

2.3.4 WAIVERS OF TIS DUE TO LOCATION WITHIN A TID

If a development does not meet the criteria of Section 2.3.2 or 2.3.3, DelDOT, at its sole discretion, may waive its requirement for a TIS if all of the following conditions apply:

1. All of the development entrances are located within the boundaries of a TID.

2. The TID has been created:

   a. By virtue of

      i. An act of the General Assembly; or
      ii. An action of the Council of a Metropolitan Planning Organization; or
      iii. A Memorandum of Agreement between DelDOT and the relevant local government(s);

   and

   b. For purposes that include the implementation of transportation improvements that are based on forecast traffic volumes;

and

c. In conformance with the circulation element of a comprehensive plan or a related master plan;

3. The traffic forecasts used in the creation of the TID are for a year no sooner than the expected completion date of the subject development, as determined under Section 2.9.10 and one of two conditions apply:

   a. The subject development was explicitly accounted for in the traffic forecasts used in the creation of the TID; or

   b. The traffic entering and exiting the subject development would not result in an increase of more than five percent in the forecast traffic volume at any of the development entrances.

4. A specific set of transportation system improvements has been identified as necessary within the TID based on forecast traffic and other relevant factors, such as safety or structural adequacy.

5. The Applicant has agreed in writing to contribute toward the cost of the identified transportation improvements and that contribution is based on the subject development's percentage contribution to the increase in the peak hour traffic passing through the facility to be improved, with the said increase being measured from the base year to the forecast year.

The completion of a TIS and the subsequent agreement of a developer to comply with requirements resulting from the study process shall be considered to meet requirements 2.a.iii and 5 above if DelDOT finds that the TIS included all facilities that would have been included in the TIS for which a waiver is sought.

DelDOT reserves the right to require a bond or similar security as a means of guaranteeing that the pledged funds will be available when needed and/or that any required work will be completed on time and to the satisfaction of DelDOT.

2.4 TRAFFIC IMPACT STUDY PROCESS

To conduct a TIS, the Applicant shall complete the following steps:

1. A request shall be made to DelDOT to schedule a mandatory Scoping Meeting in accordance with Section 2.5.1. The Applicant shall provide a copy of this letter to the applicable local land development agency concurrent with its submission to DelDOT.

2. A Scoping Meeting shall be held with DelDOT, and at DelDOT's discretion, with representatives of the local land use agency to discuss the proposed development and the scope of work for the project TIS.

3. When the Applicant's engineer supplies a proposed Scope of Work Letter in accordance with Section 2.5.2, DelDOT shall provide a confirmation of the Scope of Work Letter, incorporating necessary revisions and additions to the Applicant's engineer for completion of the TIS.

4. Count and Trip Distribution Data. After the Applicant receives the confirmation of the Scope of Work Letter, the Applicant's engineer will complete traffic counts and the proposed trip distributions for the developments to be addressed in the TIS. The count data and proposed distribution shall be submitted to DelDOT prior to completion of any additional analysis. Once submitted, DelDOT will review the count and trip distribution information and will

approve the data or, in the alternative will provide requirements for revisions to the data, which could include provision of future base volumes, the provision of growth factors to be used in calculating such volumes, or modifications to distribution percentages.

5. Preliminary Traffic Impact Study Report. After the Applicant receives the confirmation of the Scope of Work Letter the Applicant's engineer will complete the elements of the report indicated in Sections 2.6 and 2.7 and shall submit one copy of the information to DelDOT as the "Preliminary Traffic Impact Study" (PTIS). This information allows DelDOT to review the base data prior to completion of the full analysis by the Applicant's engineer, saving the Applicant's engineer from potential resubmissions of more detailed analyses if a correction is required by DelDOT to the base data or assumptions. DelDOT shall respond by approving the PTIS either as submitted or with required amendments or additions. If significant problems are found, e.g., changes are needed to volumes in several report figures, further submissions at this stage will be required.

6. Traffic Impact Study Report. After acceptance of the PTIS by DelDOT, the Applicant's Engineer shall complete the TIS in accordance with the analysis provisions of Section 2.8 and submit three copies of the full report (including the Preliminary TIS sections) to DelDOT for review. The final TIS report may be rejected by DelDOT if the report deviates from the approved PTIS, either through failure to make revisions or the inclusion of new, un-reviewed volumes.

7. Department Recommendations and Requirements for Access. When DelDOT finds that the TIS is satisfactory and agrees with its conclusions, DelDOT shall establish conditions for approval of construction of subdivision roads and for approval of access to state-maintained roadways, and shall provide a letter detailing the conditions to the Applicant. Either prior to or at the same time that the Applicant is provided with the conditions letter, DelDOT may also provide copies of its requirements, recommendations and conditions to other relevant agencies, including the local land use agency. The Applicant shall still be subject to the plan review and entrance plan requirements of the Development Coordination Section.

2.5 SCOPE OF WORK DETERMINATION AND CONFIRMATION

2.5.1 LETTER TO REQUEST SCOPING MEETING

An Applicant considering submission of a subdivision or site plan development application shall request in writing, through Applicant's engineer, a Scoping Meeting with DelDOT to discuss elements of the project and project analysis assumptions.

The Applicant shall supply to DelDOT three copies of the request for the Scoping Meeting letter which, at a minimum, shall include the following information for the proposed development, using the Scoping Meeting Information Form found in Appendix O:

a. Name and address of Applicant;
b. For a partnership, limited liability company, corporation or other entity owning the project, a list of all partners, members, or shareholders having an interest of 10% or greater, along with the percentage of ownership interest of such partner, member or shareholder in the entity;
c. Lot location noting route, directional orientation, milepoint, municipality and/or county;
d. Size, type and zoning of each different existing and proposed land use on the site;
e. Sketch plan of site, showing both sides of the roadways adjacent to the site, with

existing and proposed access, and proposed highway improvements under consideration;

f. Proposed study area for the TIS;
g. Proposed times and days to be analyzed;
h. Projected trip generation, distribution and assignment to the road network for each land use and time period proposed to be analyzed;
i. Proposed build-out year, or if project is to be phased, phase-in dates;
j. A request to DelDOT for a list of committed developments within a two-mile radius of the exterior boundaries of the project and for available safety/accident data to be analyzed during the TIS;
k. A list of anticipated required approvals for the proposed development;
l. Any other analysis assumptions the Applicant proposes using for the study;
m. Any other information that would have a material bearing on the effect of the proposed development, including known transportation improvement projects within the area and available safety/accident data;
n. Copy of tax map showing block number, lot number, parcel number and lot lines;
o. Traffic Analysis Zone number(s) for zone(s) in which the site is located;
p. Names and titles of people anticipated to attend the Scoping Meeting;
q. Evidence that the Applicant and the current property owner were notified of the request for the meeting; and
r. Suggested agenda for the Scoping Meeting.

One copy of the request for Scoping Meeting letter shall be sent to the applicable local land use agency concurrent with the submission of the letter to DelDOT. The Applicant may be requested to demonstrate to DelDOT that it has provided a copy of the letter to the land use agency. Failure to provide a concurrent copy of the request for Scoping Meeting letter to the local agency may result in the delay or postponement of the Scoping Meeting.

2.5.2 SCOPING MEETING

DelDOT will schedule the Scoping Meeting. Attendance at the Scoping Meeting by the Applicant's engineer is mandatory.

At the Scoping Meeting, the Applicant's engineer shall, at a minimum, be prepared to discuss the following TIS topics:

a. Intersections and roadway segments to be studied;
b. The impact of any committed developments within a two-mile radius of the exterior boundaries of the project on the project study area;
c. The availability of accident data within the proposed study area and the requirements for analysis based on that data;
d. Method to be used to project traffic growth;
e. Traffic count locations and proposed schedule for manual and Automatic Traffic Recorder (ATR) counts;
f. Times and days of analysis;
g. Any anticipated seasonal variations of use;
h. Methods to be used to generate, distribute and assign trips;
i. When appropriate for use in the TIS analysis, pass-by and internal trip capture assumptions, which shall be supported with documentation confirming the appropriateness, including illustrations showing this credit;
j. Other information and assumptions to be used in the analysis for the report.

2.5.3 CONFIRMATION OF SCOPE OF WORK FOR THE TIS

If after the Scoping Meeting the Applicant decides to proceed with the project, the Applicant's engineer shall submit a draft Scope of Work Letter which documents the TIS study area and the assumptions for the analysis based on and including the topics and discussions of the Scoping Meeting. The submission of this shall be accompanied by a fee in the amount of

$5000.00. The Applicant may submit the letter to DelDOT at the conclusion of the Scoping Meeting (provided that the letter detailing the proposed scope is consistent with the outcomes of the Scoping Meeting) or subsequent thereto.

The scope of study letter shall include, but not be limited to:

A. Proposed study area limits.
- In considering the study area limits, DelDOT shall consider the area of influence of the proposed development on the surrounding roadway network in determining the extent of impact and required improvements resulting from the development.
- DelDOT will also consider local requirements for area of influence when determining the study area limits.

B. Trip generation rates, which shall include:
- A land use code from the Institute of Transportation Engineers publication "7th Edition Trip Generation," or superseding edition, or superseding rates adopted by DelDOT. For land uses not included in these sources or when an Applicant believes these rates are not representative, DelDOT may, in its sole discretion, accept alternative evidence of representative rates;
- A tabular summary indicating the entering, exiting and total trips for a.m., p.m., and weekend peak hours and the weekday and weekend daily trips.
- When applicable, a pass-by and/or internal capture trip credit, with a statement providing support for its appropriateness, including illustrations showing this credit;

C. Trip distribution documentation of rationale and procedures, which may include a gravity model or site specific survey; and

D. A site traffic assignment, which shall include:
- A total site traffic assignment figure for each peak hour trip analyzed; and
- A scope of study diagram indicating each analysis point and its associated trips. This diagram shall be by direction of travel, either to or from the site.

Within 30 calendar days of the submission of the proposed scope of study and fee, DelDOT shall issue a confirmation of the Scope of Work Letter that confirms the scope of study for the TIS, as modified and detailed by any changes that DelDOT determines may be needed. DelDOT shall make the final determination regarding study area and items to be included within the scope of work.

DelDOT may require a revised scope of work if the TIS is not submitted within a 12-month period from the date of the Scope Confirmation Letter, or within a time period earlier than 12 months should conditions in the study area change. A revised scope of work letter may require a restart of the TIS process, including a requirement for a new processing fee.

2.6 TRAFFIC IMPACT STUDY REPORT FORMAT

All TIS submittals shall be signed and sealed on the first page by a licensed Delaware Professional Engineer.

The pages of the TIS shall be numbered and the topics shall be addressed in the same sequence as they appear in this subsection.

The following outline details the Topic Sections to be contained in a TIS*:

a. Table of Contents;
b. List of Figures;
c. List of Tables;
d. Executive Summary;
e. Project Description;
f. Study Area;
g. Existing Traffic and Transportation Conditions;
h. Trip Generation;

i. Pass-by and Internal Capture Trips (if appropriate)
j. Trip Distribution;
k. Trip Assignment;
l. Future Traffic
   - Traffic Analysis
   - Analysis Years
   - Peak Hour Factors;
m. Safety Evaluation and Adequacy of Sight Distance;
n. Geometric Design, Operational and Circulation Improvements;
o. Impacts on Bicycles, Pedestrians, and Transit;
p. Capacity Analyses;
q. Mitigation Identification;
r. Recommendations;
s. Conclusions; and
t. Appendices
   1. Traffic Count Summary Sheets
   2. Collision Diagrams
   3. List of Committed Developments
   4. Trip Generation, Distribution and Assignment Calculations for the subject development and all committed developments
   5. Capacity Analysis Worksheets
   6. Critical Movement Summation Forms and Signal Timing Sheets
   7. DelDOT and Applicant Correspondence
   8. Support for Recommendations

**While Items 2.6.e through l and t.1. and t.4. constitute the contents of the Preliminary TIS as discussed in Section 2.8, they should also be submitted as part of the final TIS document.*

2.7 CONTENT OF TRAFFIC COUNT AND TRIP DISTRIBUTION SUBMISSION

To avoid repetition of work in preparation of the Preliminary TIS and expedite the review process, traffic count data and proposed trip distributions for the subject development and all committed developments shall be submitted for review as follows:

1. Prior to beginning preparation of the Preliminary Traffic Impact Study, described in Section 2.8, the Applicant shall submit to DelDOT a single copy of the data from the tasks completed in accordance with the work outlined in Sections 2.9.5.1, 2.9.5.3 and 2.9.7, and the proposed trip distributions for all committed developments.
2. DelDOT shall review the items listed in paragraph 1 above and respond by approving them for use in the Preliminary TIS either as submitted or with required amendments or additions. If significant problems are found, e.g. unacceptable traffic counts, a resubmission at this stage will be required. At this time, DelDOT will also provide any additional data needed for the Applicant's engineer to project future traffic in accordance with Section 2.9.10.

2.8 PRELIMINARY TRAFFIC IMPACT STUDY REPORT CONTENT

To avoid repetition of analyses and expedite the review process, a Preliminary TIS report shall be completed as follows:

1. Prior to beginning the analysis work outlined in Section 2.9.11, the Applicant shall submit to DelDOT a single copy of the data from the tasks completed in accordance with the work outlined in Sections 2.9.2. through 2.9.10 and corresponding to report topics 3.e through l and t.1. and t.4. in Section 2.6. Furthermore, diagrams of future peak hour traffic both with and without site traffic added shall be included in the report.
2. DelDOT shall review the Preliminary TIS and respond by approving the Preliminary TIS either as submitted or with required amendments or additions. If significant

problems are found, e.g., unacceptable traffic counts, a resubmission at this stage will be required.

2.9 TRAFFIC IMPACT STUDY CONTENT

The TIS shall evaluate the intersection and roadway sections detailed in the Scope of Work Letter confirmation for the proposed development. The following information shall be included:

2.9.1 EXECUTIVE SUMMARY

An Executive Summary shall be included at the beginning of the TIS report. The Executive Summary shall discuss the analysis and conclusions and identify recommended transportation improvements.

2.9.2 SITE INFORMATION

The following information shall be included in site information:

1. Name(s) and address(es) of the site owner and Applicant;
2. Lot location noting tax parcel numbers, municipality (if incorporated), county;
3. Routes of access, with their direction and milepoint;
4. Size and type and zoning of all existing and proposed land use on the site;
5. A topographic site map (if available) and aerial photos; and
6. Sketch plan of site (24" x 36") that includes the right-of-way (throughout), curb lines, entrances and lane striping of both sides of roadways adjacent to the site.

2.9.3 PROJECT DESCRIPTION

The TIS shall provide a comprehensive project description including, but not limited to, the following:

1. Site plan showing block number, lot number, lot lines, proposed site access (including existing to remain), and proposed transportation improvements;
2. Project phasing and schedule: development staging identifying the year of development activities per phase and proposed access plans;
3. Narrative on the intended use of the site, including the range of uses allowed without additional land-use approvals and the ITE land use code(s) used to generate trips:
   a. Residential developments should be described in terms of number and type of dwelling units, e.g., 32 single-family homes;
   b. Non-residential uses should be described in terms of use and gross leasable floor area or another relevant descriptor, e.g., industrial type of warehousing, or general or medical office;
4. Frequency of use:
   a. Anticipated peak days and hours of operation should be described;
   b. Any anticipated seasonal variations of use should be discussed;
5. Intensity of use:
   a. At a minimum, the proposed use and buildable area (in square feet) of the site must be specified;
   b. For residential uses the buildable area (i.e., density) shall be described as the number of dwelling units per acre;
   c. For non-residential uses the buildable area shall be described in terms of floor area ratio and gross square footage by use which should be specific (e.g. medical office vs. office);
6. Digital photographs of the site shall be provided showing sufficient detail of relevant features impacting traffic, including

but not limited to, existing and proposed access entrances, adjacent entrances on both sides of the street, and features and intersections within the influence area.

2.9.4 TIS STUDY AREA DESCRIPTION

The TIS shall provide a complete evaluation of existing conditions and include maps and tables displaying the following information for the study area identified in the confirmed Scope of Work Letter:

1. Study Area/Vicinity Map. A map showing the street system including street names, functional classifications and entrance locations as specified in Chapter 3;
2. A description of and rationale for the study area limits including intersections, roadway weaving sections and ramps to be studied;
3. Schematic diagram(s) of existing and future roadways and intersections including traffic control, geometric features (pavement, lane and shoulder widths, channelization, etc.) sidewalks, bikeways and roadway striping;
4. Any functional, operational or programmatic activities, including public and private operators or carriers, which affect trip making activity such as ridesharing participation, park and rides, transit services, or other travel demand management methods;
5. Intersection lane configurations in the study area;
6. Traffic signal information including traffic signal locations, type and capabilities of existing signal hardware, and the signal timing chart, time of day chart, split charts and signal progressions from the Traffic Management Center;
7. Existence of any privately owned shared access agreements or cross access easements;
8. Description, location and schedule of proposed transportation improvements and/or public or private mitigation, within the study area; and
9. Digital photographs of each approach of each intersection included within the study area, as well as other locations as may be requested by DelDOT in the confirmed Scope of Work Letter, sufficient to determine relevant features including, but not limited to, traffic controls, striping and signing locations.

2.9.5 EXISTING TRAFFIC AND TRANSPORTATION CONDITIONS

The report shall provide an inventory of the following traffic and transportation existing conditions for the Study Area identified in the confirmed Scope of Work Letter:

1. Narrative and flow diagrams of seasonally adjusted peak hour traffic through the study area and identification of peak hours. **N.B.:** Flow diagrams must be continuous. Separate diagrams of each intersection are not acceptable;
2. Narrative describing existing pedestrian, bicycle and transit conditions within the study area. Transit information should include routes, stop and shelter locations, route numbers, headways, frequency, passenger boardings, pull outs, and times of service;
3. Existing Condition Traffic Data.
   a. Unless explicitly eliminated from the Scope of Work by DelDOT, the Applicant shall provide traffic count data generally taken on a Tuesday, Wednesday, or Thursday, within 12 months of the application date.
   b. Classified peak hour manual turning-movement counts[1] for one day shall be supported by one week of machine counts.
   c. To be acceptable, manual count volumes must be within 10 percent of the

[1] Classified counts are traffic counts that group trucks of 6 wheels or more, public transit buses, automobiles and pedestrians for each intersection movement. Pedestrian counts shall be made where right turn on red is permitted or where pedestrian traffic is or can be expected.

machine count volumes for the same time periods on each approach that day.

d. For weekday a.m. and p.m. peak hours, manual counts shall be factored to agree with the highest of the weekday machine counts for the highest a.m. and p.m. peak hours respectively.

e. For Saturday peak hours, manual counts do not need to be factored if they are within 10 percent of machine counts. To be acceptable the manual count must include the peak hour identified from the machine counts.

f. Two-way (i.e., showing separate counts for each travel direction), all lane, ATRs shall be placed in the locations required in the confirmed Scope of Work Letter. If an ATR malfunctions, the counter should be restarted on the nearest whole day to make up the week (e.g. if a count starts on a Monday morning and the ATR breaks down on Wednesday afternoon, the Monday and Tuesday data will be useable but the count will need to be started again on a Wednesday morning to complete the week).

g. All counts shall be included in the traffic impact study as an appendix. The Applicant's Engineer shall provide evidence of proper calibration of automatic traffic recorder (ATR) equipment.

h. Traffic counts shall be shown by 15-minute intervals over a period long enough to establish relevant peak hour(s). The manual peak hour count period is generally two hours.

i. Traffic counts shall not be taken on, or the day before or after, holidays or other special events when traffic may not be representative of average daily traffic.

j. Days and times of manual turning movement peak hour counts shall be approved by DelDOT should normally be conducted on a Tuesday, Wednesday, or Thursday from 7 a.m. to 9 a.m. and from 4 p.m. to 6 p.m. However, these days and times may differ depending on the type of development proposed.

k. Counts also shall be provided for weekends if weekends are the peak traffic period for either the existing street or the proposed development.

l. Counts to be made on streets near a school shall be done when the school is in session.

m. If another TIS has been done in the area (provided that counts used in the TIS were taken within the past year) and DelDOT believes that it is relevant to the proposed project, DelDOT may, in its sole discretion, provide copies and the traffic counts from such a TIS may be used. Other traffic counts may be available from the Traffic Section, but must be deemed acceptable by DelDOT prior to their use in a TIS analysis for the project. If DelDOT allows the use of previous count data, it may also require actual sample counts at locations of its choosing to use as a verification of prior counts, and may require adjustments to the prior counts based on sample count verifications.

n. Vehicle classification must be sufficient to address the needs of the TIS, in most cases simply determining a percentage of heavy vehicles. However, where large percentages (i.e., 5 percent or higher) of multi-axle vehicles are present it may be necessary to more finely stratify the classification in order to conform to the machine count. Also, if a turning movement volume is less than 100 vph, 5 percent heavy vehicles shall be assumed and vehicle classification is unnecessary.

o. Seasonal variations in traffic volumes shall be considered. A seasonal adjustment factor may be provided by DelDOT to be applied to the volumes, and/or DelDOT may require traffic counts during summer periods in eastern Sussex County or along routes containing a high percentage of resort-oriented traffic.

p. During the counting period, the counter shall record the basic weather conditions, and any features or events

particular to the count location such as detours, construction, or accidents. These conditions and events shall be included within the traffic count information provided to DelDOT by the Applicant's Engineer when submitting the counts. An event occurring during the manual count will not necessarily disqualify the count from use in the analysis if the event has not materially impacted traffic flow conditions. However, events such as steady rain, snow-covered surfaces, accidents or detours which block or substantially lower the rate of traffic flow through an intersection shall automatically require that the intersection volumes be recounted during a period of normal traffic flow conditions. DelDOT in its sole discretion shall determine the validity and usability of count data supplied by the Applicant's Engineer.

q. Any new traffic counts should be submitted to DelDOT both electronically as PETRA or Excel files and as draft report figures showing peak hour volumes posted on continuous flow diagrams of the road network. Individual location diagrams are not acceptable. Peak hour time period, day and date of count shall be shown on the forms.

r. At or after the Scope of Work meeting, DelDOT may approve alternative proposals for counting programs as long as they conform to the intent of the program as outlined above.

4. Crash Data

a. If an intersection in the study area or a location along the site frontage has been addressed in current or past Highway Safety Improvement Programs (HSIPs) the Applicant's Engineer should report on the status or results of its inclusion in the program.

b. For all other intersections in the study area and locations along the site frontage, the Applicant's Engineer should provide collision diagrams showing crash data for the most recent three-year period for which data is available.

2.9.6 TRIP GENERATION

The trip generation section of the TIS shall include a narrative describing the methodology used to generate site trips.

Estimates of the proposed development's trip generation shall be made for peak period traffic. Selection of the peak period used in the analysis shall be justified and shall consider, at a minimum, the peak period for the proposed development, and the peak period for surrounding streets. DelDOT may, in its confirmed Scope of Work Letter, require other time periods based on known or anticipated marginal or substandard traffic capacity or traffic safety. Except as directed and approved by DelDOT, trip generation estimates shall be based on ITE's *Trip Generation* (latest published edition) using the procedures of the *Trip Generation Handbook*. DelDOT may approve different trip generation rates when trip generation rates are not available in ITE's *Trip Generation* or if different rates are justified.

The seventh edition of ITE's *Trip Generation* does not specifically address duplex dwellings, defined as single structures, each containing exactly two distinct dwellings. For the purposes of this chapter, until ITE provides specific guidance to the contrary, treatment of duplex dwellings shall be consistent with their architectural characteristics, (i.e., structures in which two dwellings resembling single-family detached houses share a common wall shall be treated as two single-family detached houses; structures in which two dwellings resembling townhouses share a common wall shall be treated as two townhouses; and structures, in which the dwellings are stacked, one above the other, shall be treated as apartments or condominiums, depending on their form of ownership. DelDOT shall provide the final

determination on how a building is to be classified based on its characteristics.

Previous traffic counts taken by the Applicant's Engineer or others at similar sites for the same use may be used with the approval of DelDOT. If new counts are to be done to determine a trip generation rate, the sites to be counted shall be subject to DelDOT review and approval and DelDOT shall be given sufficient notice of the counts that they may be observed to ensure accuracy. Secondary measures of traffic, such as receipt counts or parking lot traffic may be accepted in some cases. In all cases, the method of trip generation must meet with the approval of DelDOT.

A tabular summary indicating the entering, exiting and total trips for a.m., p.m., and weekend peak hours and the weekday and weekend daily trips shall be provided.

2.9.7 TRIP DISTRIBUTION

The Applicant's engineer shall provide:

1. Trip distribution documentation in the form of a narrative of rationale and procedures, possibly including a gravity model or site specific survey. Traffic generated by the proposed development shall be distributed within the study area using engineering judgment based on knowledge of surrounding traffic characteristics;
2. Proposed trip distributions for the developments to be addressed in the TIS should be submitted for review with the traffic counts;
3. Road network diagram(s) of percentage distributions to and from the site shall be included in the TIS report;
4. Trip distribution shall be done by assigning percentages of the traffic entering and leaving the site to the principal directions of travel. This shall be done separately for different types of land use within the site. Generally, inbound and outbound percentage distributions in the a.m. peak hour should be the reverse of the p.m. peak hour. Where a different distribution is used, it must be justified; and
5. The source of the distribution assumptions shall be noted in this section if it is not original to the report.

2.9.8 TRAFFIC ASSIGNMENT

Road network diagrams of traffic assignment shall be included in the report.

The traffic assignment shall follow logically from the trip distribution. Any special conditions must be explained.

Peak-hour traffic volumes covering the analysis area shall be depicted graphically. They must identify site generated, background, pass-by, and total traffic.

Entering and exiting traffic shall be routed on public roadways and the Applicant's site unless Applicant can demonstrate that there is or will be a cross-access easement. Routing on any other site shall be permitted only with the expressed approval of DelDOT.

The source of the assignment shall be noted in this section if it is not original to this report.

2.9.9 PASS-BY AND INTERNAL CAPTURE TRIPS

The source for determining pass-by and internal capture trips should be the ITE *Trip Generation Handbook*. DelDOT, at its sole discretion may provide guidance to apply pass-by percentages where no information is provided in the ITE *Trip Generation Handbook*.

Justification shall be provided for any credits or reductions for pass-by trips or mixed-use developments. Included shall be an explanation of how these trips are being captured and a demonstration that the existing traffic volume is high enough to support the pass-by rates used. Assumed internalization must be supported by a sketch plan showing a balanced and interconnected site circulation system.

Because of the highly subjective nature of pass-by trips and internal capture trips, it is important to discuss them at the Scoping Meeting. An agreement on the rates or an agreement on the approach must be reached at the meeting and included in the confirmed Scope of Work Letter.

2.9.10 FUTURE TRAFFIC

Road network diagrams of future peak hour traffic, both with and without site traffic added, shall be included in the report.

There are three acceptable ways of projecting future peak hour traffic:

1. Through growth factors by which existing volumes should be multiplied;
2. Through assumptions made, in conjunction with, and subject to the approval of, DelDOT and the local zoning/land development agency, as to types and levels of development for the undeveloped land in the study area which are then used to generate and distribute trips for these developments; or
3. Through use of forecast volumes from a DelDOT travel demand model.

DelDOT shall determine which method, or combination of methods, is appropriate and will consider local requirements in making its determination.

DelDOT shall provide applicable growth factors and/or, if the land development agency requests, a list of committed development to address.

Future peak hour traffic should be calculated for conditions in the project's year of completion (build out year) and, if specified by DelDOT, at other significant conditions such as before or after highway projects are completed:

a. For residential developments, calculation of the project's year of completion shall assume a total of two years from the Scoping Meeting date for design and plan approvals and a minimum of one year per 50 dwelling units, provided that for a development containing two or more dwelling types (detached houses, townhouses, and apartments) the calculation may be based on the dwelling type that predominates;
b. For non-residential developments, calculation of the project's year of completion shall assume a total of two years from the scoping meeting date for design and plan approvals and a minimum of one year of construction.

   An exception to the assumption of two years from the scoping meeting date for design and plan approvals may be permitted at DelDOT's sole discretion if the applicant provides a letter from the local land use agency advising that plan approvals can be expected sooner.

Peak hour factors for use in the analysis of future conditions should be determined when the future volumes are calculated. Future peak hour factors shall be subject to DelDOT review and approval. Calculation of peak hour factors is further addressed in Section 2.9.11.6.6.

2.9.11 ANALYSIS

2.9.11.1 General Criteria

The impact analysis section shall include a narrative of the standards and methodology used for each element of the analysis.

The TIS shall evaluate access, safety, operation, capacity, circulation, level of service, and performance of the transportation system within the proposed development's Study Area as outlined in this section.

The Applicant shall include analysis results in tabular format wherever possible. Tables shall show evaluation criteria, including level of service and delay, for all intersections and roadway segments identified in the confirmed Scope of Work Letter for analysis for each of the following applicable conditions:

1. Existing;
2. Future without Project;
3. Future with Project and proper entrance; and
4. Future with Project, proper entrance, and off-site improvements

2.9.11.2 Safety Evaluation

Existing and potential safety problems resulting from conflicting turning movements between and among entrances, intersections, and internal traffic shall be corrected or improved as required.

Entrances on both sides of the streets fronting the site, in both directions, shall be shown on the site plan at lengths as indicated in **Figure 3.1** in Chapter 3. The safety evaluation shall include a discussion and, where necessary, calculations demonstrating that movements to and from the entrance will not conflict with the turning movements from adjacent entrances.

On-site entrance stacking and queuing impacts, the on-site roadway network for the project, and the potential for shared access with adjacent development also shall be assessed.

2.9.11.3 Geometric Design, Operational and Circulation Improvements

Geometric design, operational and circulation improvements including, but not limited to, acceleration lanes, deceleration lanes, turning lanes, traffic signals, roundabouts, creation of one-way streets, and channelization shall be considered, evaluated, and required when determined necessary.

No operational analysis completed under the TIS process shall be construed to relieve the Applicant of any operational analysis required during the access review for the development.

2.9.11.4 Adequacy of Sight Distance

Entrance and intersection sight distance requirements shall meet DelDOT standards.

Adequacy of sight distance shall be demonstrated at:

1. Identified locations within the scope of work area; and
2. The proposed road access point(s) for both the existing road configuration and for the ultimate road configuration based on improvements planned for the development and improvements identified in the applicable local Comprehensive Plan Transportation Element.

2.9.11.5 Impacts and Opportunities for Bicycles, Pedestrians and Transit

1. The analysis shall identify and evaluate related impacts on bicycle, pedestrian, and transit access, circulation, and facilities.
2. Opportunities to provide for improved bicycle, pedestrian and transit access and circulation shall be noted in the analysis.

2.9.11.6 LOS Analysis

1. A Level of Service analysis will be used to determine the impacts and required improvements, if any, that a proposed site will have on the roadway network within the study area.
2. Capacity analyses shall be completed for all intersections, roundabouts, roadway sections, weaving sections and ramps itemized and included within the study area outlined in the confirmed Scope of Work Letter.
3. The Applicant shall complete a LOS analysis for each of the following conditions:
   a. Existing;
   b. Future without project (FWOP);
   c. Future with project and proper entrance (FWP); and
   d. Future with project, proper entrance and off-site improvements (if needed) (FWP and improvements)

   Results of the LOS analysis for each condition shall be provided in a Tabular format that includes the LOS and delay for each approach analyzed at each analysis location.

4. Analysis Criteria and Assumptions – Unless expressly authorized by DelDOT, all analyses shall be done in accordance with the 2000 Highway Capacity Manual (HCM), or superseding edition, procedures.
5. Analysis Software – The analysis should be completed using the most recent version of the Highway Capacity Software (HCS) that implements the HCM, and include completed input worksheets from the HCM software analysis, as well as any printed output from the software. If a detailed output format is submitted, then input worksheets are unnecessary.
6. Peak Hour Calculations – The Applicant's engineer shall calculate the peak hour factors for existing conditions. Where no increases in volumes are projected, the Applicant's engineer shall use those observed peak hour factors for future conditions as well. The Applicant's engineer must calculate all peak hour factors by lane group.
7. Lane Utilization Factors – Except as directed by DelDOT, all signalized intersection analyses shall use the HCM default lane utilization factors.
8. Any modification of default values in the HCS software shall be listed in the report within the appropriate section(s) along with the reasoning for the modification.
9. For specific facilities or circumstances where DelDOT determines that use of software other than HCS is more appropriate, it may authorize the use of that software at its sole discretion.

2.9.12 LOS STANDARDS

2.9.12.1 General

LOS standards shall be applied based on the location of the proposed development.

1. Development in Developed, Developing or Planned Development Areas

If a proposed development is located within a developed, developing or planned development area, all intersections, roundabouts, roadway sections, weaving sections and ramps analyzed will be subject to the LOS standards for those areas even if the intersection, roundabout, roadway section, weaving section or ramp is in a rural area..

2. Development in Rural Areas

If a proposed development is located in a rural area, all intersections, roundabouts, roadway sections, weaving sections and ramps shall be subject to the LOS standards for such areas even if the intersection, roundabout, roadway section, weaving section or ramp is inside a developed, developing or planned development area. Levels of service shall, in most cases, correspond directly to those in the HCM unless specified to the contrary.

DelDOT recognizes that the standards in this manual will not be appropriate to all areas. A local government, as part of its adopted comprehensive plan, may determine that acceptance of a lower LOS (D, E or F) for some portion of the day is necessary and appropriate for the pattern of development they seek to create. If a proposed development is located in, or affects, such an area, DelDOT will consider the local government's standards to the extent that adherence to them does not result in substandard LOS or unacceptable operational condition outside that area.

2.9.12.2 Uninterrupted-flow Standards

LOS for uninterrupted flow locations will be measured by density and volume to capacity ratio (V/C) and conform to the values shown in Exhibits 20-2, 21-2, and 23-3 of the HCM.

When a development is in a developed, developing, or planned development area, an increase in the uninterrupted-flow V/C ratio to the low point of LOS D (approaching LOS E) will be allowed

When a development is in a rural area, an increase in the uninterrupted-flow V/C ratio to the low point of LOS C (approaching LOS D) will be allowed in the FWP condition.

In analyzing facilities for which HCS does not calculate V/C ratios, e.g. multi-lane

highways and freeways, separate calculation is required as determined by DelDOT.

2.9.12.3 Signalized Intersection Standards

All signalized intersections shall be analyzed using the following criteria for evaluating impacts and needed improvements:

1. Sites in developed, developing or planned development areas: For each intersection, deterioration up to 55 seconds (the bottom of LOS D) will be allowed for the FWP Condition.
2. Sites in rural areas: For each intersection, deterioration up to the 35 seconds (bottom of LOS C) will be allowed for the FWP condition.
3. Regardless of LOS, DelDOT shall require turning lane improvements to accommodate 95th percentile queue lengths.
4. The analysis shall document that the impacts of queuing from adjacent intersections or traffic restrictions have been addressed.
5. The analysis shall document the interaction of conflicting movements at adjacent entrances.
6. The analysis shall note changes made in signal timing and phasing (i.e. protected, permitted, etc). **The Applicant shall obtain approval from DelDOT prior to incorporating phasing changes in its analysis.**
7. Minimum green times must be equal to or greater than minimum pedestrian crossing times on each approach unless specifically authorized by DelDOT.
8. If there is a traffic signal within 2,640 feet of the site, an arterial analysis as in the HCM Chapter 15 may be required.
9. In determining the signal timing for FWOP it shall be assumed that the existing traffic signal hardware will still be in use. Any recommendations for timing modification must be supported by the hardware and appropriate for the future year no-build traffic volumes. The build analysis may use traffic signal timing changes that are possible with new traffic signal hardware, provided the hardware is a recommendation for mitigation, and should comply with the standards for progression.

In addition to the HCM analysis, the Applicant must provide Critical Movement Summation forms in an Appendix to the TIS for all existing or proposed signals. CMS calculations shall be done using the standard form shown in Figure P-4 in Appendix P.

2.9.12.4 Roundabouts

References to the HCM and HCS notwithstanding, the current US version of aaSIDRA with the US environmental factor shall be used for the analysis of roundabouts. For developments in developed, developing or planned development areas, the minimum acceptable LOS shall be D. For developments in rural areas, the minimum acceptable LOS shall be C. The analysis should be done using NCHRP Report 03-65.

2.9.12.5 Unsignalized Intersection Standards

For unsignalized intersections LOS will be measured by control delay per Exhibits 17-2 and 17-22 of the HCM.

Turns may not cause excessive disruption to through traffic and may not be allowed when acceptance of substandard gaps is promoted. In some cases, elimination of the movement and diversion of the demand to a nearby location is the preferred treatment. Comments on the interaction of conflicting movements at adjacent access points may be required.

For developments in developed, developing or planned development areas, the maximum allowable delay for each movement shall be 35 seconds (bottom of LOS D) in the FWP condition.

For developments in rural areas, the maximum allowable delay for each movement shall be 25 seconds (bottom of LOS C) in the FWP condition.

Unacceptable delay during a peak hour at a site entrance is not necessarily a justification for

the installation of a traffic signal. While the installation of a signal may be appropriate at some point, in which case an agreement to fund that signal shall be required, DelDOT determines whether to install signals on the basis of 12-hour warrant studies.

Where the FWP volume on a stop-controlled approach would be 10 vph or less, any LOS problem that might exist is considered to be negligible and its mitigation is not required.

2.9.12.6 Weaving Area Standards

For the weave area, LOS will be measured by weaving speed and non-weaving speed and conform to the values shown in Exhibit 24-2 of the HCM.

For non-freeways, the potential for site traffic to cause deterioration of the weaving area traffic flow and the methods to quantify such deterioration shall be discussed at the scoping meeting. Although weaving and non-weaving speeds are independent, it is desirable that these speeds be balanced. The addition of FWP traffic shall maintain the balance.

2.9.12.7 Ramp Standards

Ramp standards are based on density, the primary measure of effectiveness, and the level of service criteria shown in Exhibit 25-4 of the HCM.

- For a study location applicable to a site in a developed, developing or planned development area, with a merge or diverge influence area, the maximum allowable density shall be to 35 pc/mi/ln (bottom of LOS D) in the FWP condition.

- For a study location applicable to a site in a rural area, with a merge or diverge influence area, the maximum allowable density shall be 28 pc/mi/ln (bottom of LOS C) in the FWP condition.

2.10 MITIGATION IDENTIFICATION

In order to protect the Delaware transportation system from potentially adverse impacts of the proposed development, to fulfill an identified need for public services within the impacted area related to the development, or both, mitigation measures will be required when deficiencies have been identified or LOS results do not meet the standards set forth in Section 2.8.12.

The TIS shall identify methods of mitigating on-site and off-site deficiencies for present and proposed phases of the development. The report shall indicate the level of improvement to the deficiency, including the capacity deficiencies identified in Section 2.8.12, provided by the mitigation.

The Applicant's engineer should not limit the traffic analysis or mitigation focus to the specific location identified where an unacceptable deterioration of the LOS standards has been identified. In many cases it is preferable to direct site-generated traffic to other roadways. In other cases, improvements apart from the deficient location may divert enough background traffic to make room for the site generated traffic and thus mitigate the impacts. Most capacity analyses assume that each intersection is acting independently; therefore, the analysis must account for the presence and operational characteristics of adjacent entrances.

The Applicant's engineer shall list any factors that have been modified during analysis and the reasons for the modification.

Build out year and project phasing impacts shall be considered in the mitigation section of the report.

Mitigation shall be consistent with improvements identified in the transportation element of the relevant local government's Comprehensive Plan. At a minimum, the TIS shall consider ultimate rights-of-way and additional streets, bicycle, transit, and pedestrian connections and extensions and intersection improvements that are identified in the Transportation Element of the relevant local government's Comprehensive Plan. Mitigation measures may also include, but are not limited to, additional street connections and street extensions, turn lanes and turn lane extensions, signalization, signal modifications, installation of medians, shared access and other access management strategies, geometric improvements such as lane geometry improvements, and

intersection realignments, structure widenings, frontage roads, local or collector roads, and alternative access.

Where stop-controlled intersections do not meet the minimum performance standard, an additional street connection or a street extension to distribute traffic from the site to another access point, preferably on a different road, shall be considered as a potential mitigation measure.

Mitigation measures must be evaluated with regard to their operational safety and effectiveness before being recommended. A measure that provides adequate capacity but creates an operational problem is not acceptable.

Mitigation measures that involve changes in the number or usage of lanes at an intersection or the phasing at a signalized intersection will require conceptual approval from DelDOT prior to submission of the TIS. If the Applicant's engineer proposes mitigation that involves such measures, then they shall meet with representatives of DelDOT's Traffic and Subdivision Sections, preferably at the same time, to discuss those changes and seek approval before submitting the TIS for review. If a measure is not approved, the Applicant's engineer is responsible for finding an acceptable alternative. The Applicant's engineer shall document the meeting(s) in the TIS, including the date(s) of the meeting(s), the names of those attending, the measures discussed, and the results of the meeting(s). Failure to obtain approval for mitigation measures that require it shall be cause for DelDOT to return the TIS for revisions.

The mitigation section of the TIS may include a travel demand management plan in accordance with DelDOT and local requirements. This is an optional plan. The trip reduction anticipated in an approved travel demand management plan shall be deemed to reduce the site trips, thereby also reducing site traffic impacts and associated fair share financial obligations.

2.11 RECOMMENDATIONS

If safety or capacity analyses using the existing or anticipated highway system and full development show that unsatisfactory levels of service will result, or that pedestrian, bicycle and transit accessibility and compatibility is compromised, recommendations should be made as to how this may be prevented.

Recommendation Narrative – A narrative discussing the recommendations, including a development phasing plan, if needed, to maintain Levels of Service in accordance with Section 2.8.12 shall be included in the recommendations.

Access Driveway/Entrance – In all cases, a site entrance that meets the requirements of access in accordance with DelDOT's Standards and Regulations for Subdivision Streets and State Highway Access shall be required.

All proposed improvements shall be supported by, and consistent with the analyses performed.

The following types of recommendations are anticipated:

a. Phasing development to the completion of programmed highway projects;
b. Reducing the proposed density of development (where appropriate), or construction of off-site improvements by the Applicant;
c. Improvements necessary for safe and efficient flow of vehicle, bicycle, pedestrian, and transit movements and access;
d. Operational improvements to the roadway network; and
e. Travel Demand Management Strategies.

2.11.1 DEPICTION AND INCLUSION OF RECOMMENDATION SUPPORT

All proposed recommended mitigation improvements, including needed off-site improvements, as well as all site entrance(s)

shall be illustrated at a scale of no more than 1" = 100', with 1" = 50' or 1" = 30' preferred. The drawing(s) shall show both existing and the recommended improvement conditions. In cases where improvement conditions repetitively extend, the improvements may be shown with line extensions between the end points of the improvement if there are no significant changes to the proposed features within the extensions.

If the recommended improvements include the installation of a traffic signal or the retiming of an existing signal, the proposed timing shall be appended to the TIS. Proposed signals that would be needed the day a development opens, such as at a shopping center entrance, shall be supported by 12-hour MUTCD warrant investigations. Copies of those investigations shall be appended.

2.12 REQUIRED TIS APPENDICES

Appendices shall include the following:

a. Traffic count summary sheets;
b. Collision diagrams;
c. List of committed developments;
d. Trip generation, distribution and assignment calculations for the subject development and all committed developments;
e. Capacity Analysis Worksheets;
f. Critical movement summation forms and signal timing sheets for all signalized intersections in the study area;
g. DelDOT and Applicant correspondence; and
h. Support for recommendations